2003 Department of Energy Respiratory Protection
Administrator's Session
May 21-May 23, 2003

Attendees: Greg Welch – BWXT Pantex; Larry Boyer – BWXT Pantex; Ken Meyer – BWXT Pantex; Cliff Ledford – Fluor Hanford; Roy Rubick-Argonne West; Heather Farrer-Savannah River Site; Doug Herrick-Rocky Flats; Charlie Guinn-Sandia Labs; Gordon Miller-Lawrence Livermore Labs; Myra Stafford-Los Alamos National Labs; Kathy Sliski-Wackenhut Oak Ridge

OSHA 29 CFR 1910.134 Update: Scott Ketcham, Lubbock Office, OSHA

1998 – New version of Respiratory Protection Standard
Old Standard based on 1969 and earlier ideas on Respirator Protection Program
Covers all industries except agriculture

Some standards put out by certain agencies need explanation as to when respirator use is required:

- Respirator selection
- Medical Evaluations
- Respirator fit testing
- Respirator use and maintenance
- Dust Masks – Why wear them? To protect from respiratory hazard.
- Engineering controls is the way to go. Respiratory Protection used when engineering controls can't be used.

Standard applies to biological hazards:

- Except TB. TB will (possibly) come out next year.
- With OSHA PEL's and without OSHA PEL's
- ACGIH threatened by standard. With standard ACGIH TLV's can be cited when not covered by PEL's from 1969.

Respiratory Protection Program (RPP) needs to be a written, live document and administered by suitably trained person. A suitably trained person would be: possibly an IH; someone who understands the complexity of running the program; someone who gets out in the field to monitor respiratory use, not staying behind a desk.

RPP needs to be updated to change with processes on site. Must be living document that evolves with processes on plant.

Respirator Selection is based on the program. Hazards need to be identified and evaluated. Variety of choices of respirator available including NIOSH certified respirators, various sizes and brands

Choosing the wrong respirator could cause health hazards. Are the appropriate cartridges used, has the respirator been maintained correctly, has fit test been performed to ensure correct use?

Medical Evaluations, when accurate, can determine the medical condition of the worker and whether the worker is able to wear a respirator. Heat stress or too much physical exertion are hazards to certain workers.

- Subcontractors need the same medical evaluation if wearing a respirator

- The RPPA may consider meeting with OCC MED to go over particulars of each respirator (weight of bag, hose, etc.)

- Citations may be issued for non-compliance if the plant is not performing medical evaluations on workers. If worker gives wrong information, citations will not be issued.

Employee training on respiratory hazards is helpful. Workers need to be certain of what they are being protected against.

RPP evaluations should be held at each site annually or periodically as required. It is better to have an outsider come in with objective views.

If respirator use is not required, voluntary use is an issue. Dust masks may be required, but it is a voluntary program. Exposures are minimal, acute exposures. Appendix D of RP standard is needed along with a medical evaluation if the program is voluntary. A filtering face piece dust mask can be excluded.

Respirator use may impose a problem from a radiological standpoint. Respirators may increase work time, which would increase RAD exposure. Appendix D states no use if danger posed to employee (vision obstructed, attention to detail, etc.)

A roster with signatures is a good idea to keep showing each user has knowledge and understanding of Appendix D. Signatures and dates have weight.

End of Service Life Indicator (ESLI) is a system that warns the respirator user of the approach of the end of adequate respirator protection.

Respirator Change Schedule is based on three indicators: Experimental Tests, Manufacturers Recommendations and Math Model. Also use Rule of Thumb presented in handout.

- Sources of information: MSA, North, OSHA

Service Life Issues in handout: Worker Exertion Level, Respirator Cartridge Variability, Temperature, Relative Humidity and Multiple Contaminants

Fit Testing is required for all tight fitting respirators. The test should be performed prior to the first use of the respirator and re-fitted at least annually.

- Qualitative Fit Test
- Quantitative Fit Test - most widely used. Younger workforce uses FitTester 3000, but is not NRTL approved. Porta-Cal used by aging workforce.

Respirator Maintenance is an area of inspection and repair. The assumption is that the employee will take care of the respirator, which is not a good idea without regular inspection.

- Discussion on correct use and storage of respirators and cartridges
- User seal check is biggest violation in field.

General Discussion:

- Ergonomics – guidelines for industries based on consensus through the nursing home industry, manufacturing industry, etc., may evolve into a standard. Not tied to worker's comp; working on guidelines and parameters concerning ergonomic injuries. This is the #1 priority with cooperative programs.

- ACGIH has a standard on Diesel fumes as TLV not covered by OSHA PEL's. Border crossings and vehicle searches prolong diesel fume inhalation.
- OSHA pouring money into consultations for small businesses. Also, more compliance officers. The "little guy" doesn't have a complete understanding of standards.
- Not many interpretations on website. From 1996 and back is being archived and may not be accessible.

ANSI Z88.2 – 1992 Update and DRAFT Edition: T. C. "Cliff" Ledford, RPPA, Fluor Hanford

Sub-committee from 1996 - 2002 had 15 meetings in 8 locations.

Summary of Changes:

- Addition of Voluntary Use Respirator
- Change in APR filter description
- Qualification for trainers
- QNFT is preferred method
- Inspection of new equipment
- Disposal of Equipment
- CO alarms required for oil compressor
- Introduce ambient air pump
- New Section on record Keeping
- APF's
- Additional information on description of respirator
- 3 new appendices: QA, Dew Point, EPF

Definitions:

- User seal check replaces fit check
- Addition of filtering face pieces
- Removal of poor warning properties

Respirator program requirements (Section 4)

- 4.5.3 Medical Evaluation deals with how written records are maintained

Standard Operating Procedure (Section 6)

- 6.3 Voluntary use
    - Shall be medically evaluated, trained on limitations, maintenance and cleaning.
    - Shall use NIOSH approved Respirator

Changes to 1992 Standard: Selection limitation and use of respirators (Sec. 7)

- Section is reorganized
- 7.2.2.1 Hazard determination
- 7.3.2 Selection steps
- 7.4 Change Schedules
- 7.5 Respirators for IDLH conditions
- 7.8.2 Infectious Agents

Training (Section 8)

Respirator Fit Test (Section 9)

- 9.1.2 Positive pressure respirators

Maintenance Inspection Storage and Disposal (Section 10)

- 10.2 Inspection
- 10.5 Disposal

Breathing air and oxygen (Section 11)

- 11.1 Breathing air and oxygen quality
- 11.2 Ambient Air Pump
- 11.3 Breathing Air System
- 11.4 Maintenance and Inspection of Breathing Air Systems

Record Keeping (Section 12)

- Records kept in manner consistent with regs.
- Records kept consistent to company policies

Assigned Protection Factors Table

AIHA set to vote against the ANSI Z88.2. The 1992 standard became obsolete in 2002. The majority wants it, but manufacturers are probably going to kill it.

State of the Respiratory Protection Administrator: T. C. "Cliff" Ledford, RPPA, Fluor-Hanford

RPPA Program – is it in compliance? How do you know?

- RPPA should assess
- Check breathing air cylinders
- Assessment of company doing sanitizing and maintenance
- Leak test with Q-127
- Level of support from management
- Lack of funds for replacing aging equipment

There is a copy of what type of equipment each site is using. Cliff will send it out again.

Website: **www.EH.DOE.GOV\whs\respirator** has links to go to just about anything you need.

Revisions to respirator program – annually and if any problems come up. Increasingly difficult to change.

Powered Air-Purifying Respirators (PAPRs): Douglas Herrick, RPPA, Rocky Flats

Multi-tiered contractors with lower tier doing respirator maintenance and sanitization. RPPA has no direct control. Respirators sent to Richland, Washington, for cleaning and maintenance.

Primarily MSA PAPR: considering moving to a 3M (hood) – a CFM for 12 hrs. Decided not to use for highly contaminated areas because if battery dies, protection factor essentially goes to 0. (Failed respirator)

Workers allowed wearing PAPR for comfort when APRs are required. Workers should be warned that they could still experience heat stress with PAPR – even though their head feels cool.

Recommend both belt-mounted and mask-mounted because one or the other may interfere with work depending on type of work –(overhead work among pipes, crawl spaces, etc) Only HEPA is available in mask-mounted.

MSA has nickel metal hydride battery that is much lighter than the Nicad batteries. Good for 8 hrs.

3M APRs is a good series. They are very light, no latex, fit well.

Colored tags indicate which project owns the respirator. They are done (laundered), in batches according to color.

Assume 10% battery loss after a week of storage. After that, sent back to laundry for charging.

In Beryllium areas, wet wipe and put in plastic with worker's lab bag to send to laundry. There they are opened under a hood. There is also a sink so they can open them under water. No accumulation yet detected in hood.

Two cartridges on PAPR were found to be cross-threaded; one still in bag. Two other cases where cartridges fell off. They changed to a different gasket that has greater friction. Also a locking sleeve that minimizes the chances of falling off. These are one-time use--$.50 each. Also improved transporting methods and indicators to show if it has loosened. Cliff has info on new gasket and locking sleeve. There is a new insertable cartridge that also seems to have greater resistance. Tampering was not ruled out.

There is a coupling on PAPR & SCBA that can screw off (or at least loosen) from one side when being screwed on to another. Corrected by correct assembly process and taping the joint before use. Tape must be removed before returning to laundry.

MSA PAPRs started making noise, getting hot and causing an acrid smell. Certain lot identified. Changes were made to mounting shaft of propeller. MSA has been replaced without charge. Doug will send info on this.

LANCS Co. makes a covering to minimize contamination of the motor assembly. 3M also have one.

Tyvek hoods from MSA – the lens cover that comes with them will crease the hood. Other problems with MSA products and services reported.

Presidential Order 39 said NIOSH approval not needed when it is for national security.

Safety Expo Video – Posi Check SCBA Video

Mask Fit Overview – Controlled Negative Pressure and Port-Count: Andy Coats, OHD Fit Tester 3000 and Cliff Crutchfield, PhD, CIH University of Arizona

QNFT Assumptions – are they valid?

- One size/state challenge agent fits all
- 100% filtration efficiency
- In-mask sample represents mask leakage
- Fit test exercises represent use conditions
- Big change in FF = big change in leak
- Test donning represents use donning

Controlled Negative Pressure

- Direct measurement of leakage airflow
- Challenge agent – air molecules
- Challenge pressure – inspiratory pressure at low-moderate work rate
- 8-sec measure of static leak
- Fit Factor = Qinsp/Qlk

Respirator Leakage

- Primary determinant of respiratory protection

- Defines type of respirator used
- Determines respirator fit and performance

Basic Principle of CNP

- Temporarily seal respirator face piece
- Exhaust air to establish challenge pressure
- Air enters face piece through leakage path
- Hold CP constant and measure exhaust rate
- With CP constant: Qexhaust = Qleak
- Operates at sonic velocity

CNP Innovations

- Direct measurement of leakage
- Universal challenge agent
- Test worker's actual respirator
- Effect of exercises vs. donning
- Selection of best fitting respirator

Various Graphs and Tables

- Respirator Leakage vs. Fit
- Fit Factor vs. Leakage
- CNP vs. Aerosol Systems
- Detection of Known Leakage
- Marine-2 Fit Factors
- Gas Mask w/o Eyewear Inserts
- Gas Mask w/Eyewear Inserts
- CNP Redon Protocol
- CNP OSHA vs. REDON Protocols
- Meta Analysis of Comparison
- Marine-2 Fit Factors

Chemical, Biological, Radiological and Nuclear (CBRN) Issues: Erik Johnson, CIH, 3M

Warfare Agents

- Biological Agents
  - Bacteria, virus, fungi, protozoans, toxins
  - Main Exposure through inhalation and ingestion
  - No published exposure limits
  - Particulate respirator will help reduce exposure but may not prevent illness or disease
  - Tested using 3 micron particle
  - May not know you've been exposed till after the fact
- Radiological Agents
  - Conventional explosives disperse radioactive particulate material
  - Not a nuclear bomb
  - Particles will emit radiation as part of their natural decay process
  - Particulate respirators filter radiological particles, but will not filter all forms of radiation.

- Nuclear Agents
    - Exposure is a function of the distance shielding
    - Respirators offer little protection against a nuclear blast.
    - Particulate respirators may help filter dust from a distance
- Chemical Agents
    - Solid liquid gas vapor
    - Man exposure through inhalation and skin
    - Exposure limits available for most agents
    - Standard industrial chemicals could also be used as weapons.
- NIOSH CBRN SCBA
    - NIOSH 42 CFR 84, Subpart H
    - NFPA 1981 Open – Circuit SCBA for firefighters
    - Chemical Agent permeation and penetration against sarin and distilled mustard
    - Face piece in negative pressure mode must have QNFT factor greater than 500 against corn oil aerosol
    - Can retrofit existing SCBAs to CBRN
- NIOSH Full Face piece APR
    - Chemical agent permeation and penetration against sarin and distilled mustard
    - Cartridges rated for 15-120 minutes against high concentration of ammonia cyanogens chloride, cyclohexane (organic vapors)-formaldehyde, hydrogen cyanide, hydrogen sulfide, nitrogen dioxide, phosgene, phospune and sulfur dioxide
    - Service life > 5 mins. At high flow (100 L/min)
    - P100 particulate filtration
    - Fit factor > 2000 against corn oil aerosol (at NIOSH)
    - 40 mm DIN connector
    - Field of view – Visual field score > 90
    - Low temperature fogging – visual acuity > 75
    - Lens haze, transmittance, abrasion resistance
    - CO2 < 1% on breathing machine
    - Communications – modified rhyme > 70%
    - Environmental conditioning (temperature humidity, vibration and drop tests)
- NIOSH CBRN Escape Hood
    - Final drafts expected in 2003
    - Hood covering head, eyes and respiratory system
    - Nose cup or mouthpiece to direct airflow
    - Designed for escape only
    - Testing similar to full face piece
    - Air purifying at various concentrations of both warfare agents and industrial chemicals—flame resistant with company approval
    - Self contained for unknown conditions and oxygen deficiency, full body protection
- NIOSH CBRN PAPR

- Draft in late 2003?
- Other types of devices?

- Selection and Use
  - No guidance given on CBRN Respirator
  - Dept. of Homeland Security
  - NFPA guidelines
  - Hazardous waste opes

Level B PPE
Level C PPE
Level D Normal work clothes (law enforcement, hospital personnel)

- Low exposure if patient successfully decontaminated on site
- Exposure from self-admitting patient will be < IDHL

Cautions and Limitations

- Not for use in atmospheres immediately dangerous IDLH or hazards not characterized
- If unexpected hazard use in conjunction with PPE that provides appropriate levels of protection against dermal hazard. Failure to do so may result in personal injury.
- This respirator provides respiratory protection against inhalation of radiological and nuclear dust particles
- Some CBRN agents may not prevent immediate hazards from exposure
- Respirator should not be used 8 hrs. After initial exposure to chemical warfare agents to avoid possible agent permeation.
- When used at defined occupational exposure limits rated service time cannot be exceeded.

Summary

- Understand potential warfare agents
- Select appropriate form of PPE based on potential exposure
- PPE should be used in accordance with recognized (Hazwopper) systems such as OSHA 1910.120

Overview of the Use of Hazards Assessment in Established Respirator Programs: Gordon C. Miller, Lawrence Livermore National Laboratory

Discussed handout regarding results of Hazards Assessment Survey

Wrap Up: T.C. "Cliff" Ledford

- Training: CBT Solely? Combination? At Hanford, confined space training, etc. includes using until out of air so workers know what to expect to learn to wear respirator correctly. Initial training is a separate 4-hour fit test and the refresher is 2-1/2 to 4 hrs. Worst violators are firefighters and patrol.
- Can you as RPPA go out and stop work? If you don't have that capability, get it. You have authority under OSHA
- 2005 Conference
  - Offer for Lawrence Livermore

Day 3: Vendors

Vendors present were: Scott, OHD and 3M